UNIVERSITY OF PENNSYLVANIA

An Analytic Study of One Class in High School

ANNA ELEANORA BIDDLE

A THESIS
IN PSYCHOLOGY
PRESENTED TO THE FACULTY OF THE GRADUATE SCHOOL IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY

PHILADELPHIA
1928

An Analytic Study of One Class in High School

A THESIS

IN PSYCHOLGY

PRESENTED TO THE FACULTY OF THE GRADUATE SCHOOL OF THE UNIVERSITY OF PENNSYLVANIA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

ANNA ELEANORA BIDDLE

Reprinted from
The Psychological Clinic, Vol. XVII, Nos. 4-5

PHILADELPHIA
1928

R. UNIV.
BIBLIOTHEEK
LEIDEN

AN ANALYTIC STUDY OF ONE CLASS IN HIGH SCHOOL

ANNA ELEANORA BIDDLE

Counselor, South Philadelphia High School for Girls

PART I

The Psychological Clinic of the University of Pennsylvania, under the direction of Dr. Lightner Witmer, is establishing norms at the fifteen-year-old level. This includes the high school group, which is made up of children who have completed the eighth grade and who are required to attend the high school until they go to work or reach their sixteenth birthday. The present analytic study of *all* the girls in a ninth grade is undertaken to add to the data already collected in regard to the high school group, to test the norms already established, and to add another set of norms, based upon the reverse memory span for digits.

PROCEDURE

All the examinations were made by the writer, who is a counselor in the high school and a student in the Psychological Clinic. Since the school is run on three overlapping shifts, from 8:30 to 4:30, with the freshmen reporting on the latest shift, it was possible for the examiner to use two hours a day for this investigation in addition to the usual duties of her office. It was planned to finish it in one term of 100 days, but as a school organization is a human one and not mechanical, such an arrangement of time and duties proved to be impracticable and all the cases were not finished until well into the second term.

Part I is a statement of the results of the tests made in the 9th grade, with the school histories of all individuals for the succeeding two years. Part II will be completed in 1929 and will contain the conclusions based on the complete four years' progress.

The Group

In September, 1925, the names of 428 girls appeared on the promotion lists from the eighth grades in the surrounding schools and thus automatically became enrolled in the high school. Those over sixteen years of age who did not report during the first three days were investigated and "dropped" by the Bureau of Compulsory Education. Those between fourteen and sixteen who went to work were assigned to a continuation school and also dropped; and some had moved during the summer and were transferred to other schools. Consequently only 274 children actually came and received a program of studies; sixty-nine of these left during the first term before a Binet test could be given them, so the number included in this study is 205, less than half the number which "officially" entered.

Their chronological ages at entrance range from twelve years, two months to seventeen years, eight months. The median is fourteen years, two months. The modal 60 per cent group ranges from thirteen years, six months to fifteen years, one month.

Table 1. Chronological Age Distribution
September, 1925

Decile	*Age. Years and Months*
1	12-2—13-2
2	13-2—13-6
3	13-6—13-8
4	13-8—14-0
5	14-0—14-2
6	14-2—14-5
7	14-5—14-7
8	14-8—15-0
9	15-1—15-5
10	15-6—17-8

Fourteen girls were foreign born, but only three of them had attended school in a foreign country. In 166 cases both parents were born in a non-English-speaking country (Russia and Italy predominating) and a foreign language was spoken at home. Eight girls had one parent who was born in a foreign country. Thus 84 per cent of the group have a distinctly non-English background. Ten girls were colored.

In 13 per cent of the cases the fathers were deceased or too ill to work, and the family was supported by the mother or older

brothers and sisters. Many of them "sew by coats" or pants at home. In only two cases was outside relief known to be given. In 34 per cent, the fathers were engaged in some buying and selling occupation. Their daughters called them merchants or dealers, and deeper inquiry showed that they were peddlers, push cart vendors, junk collectors, hucksters, "outside salesmen" with stands on 4th or 7th Streets, as well as renters or owners of small stores. In these cases, the mothers were needed to help as well as the men. None of them was employed as salesman in other men's establishments. The next larger group, 25½ per cent, were in an occupation which required some degree of training, as coat or vest or pants maker, tailor, carpenter, stone mason. Twenty-three per cent were untrained laborers or factory operatives. Four and a half per cent were professional men, one a physician, one an optometrist, and the others musicians. Thus the economic level represented by the group as a whole is a low one, and the majority of the families maintain their existences within the small foreign colonies where they live, independent of the surrounding city. A visit into each home was impossible for this study, but the writer had already visited every child who entered the high school during the four preceding terms, making some 2000 calls in all, so it is quite possible to understand the social, racial, and economic background of these particular children with some degree of accuracy. They are trying to break away from the restrictions of class, and reach a higher economic level via the open door of the high school. They are urged on, often beyond the limits of their own inclination and ability, by these fathers and mothers, who long to see in their children the success they have failed to achieve. The sacrifices they willingly make are beyond description. Where there is opportunity for only one, the boy is preferred. The girl must then stay home and keep the younger children while the mother sews, or go to work herself, and the boy stays in high school and even goes to college.

Tests Used

The tests given were almost the same as those used by Dr. Leaming in her investigation of the fifteen year level. The procedure followed in each case in the standardized procedure used at the University of Pennsylvania Clinic. The performance tests were the Witmer Formboard, the Witmer Cylinders, Healy A, and the Dearborn Formboard, a first and second trial being given for each

test. The Stanford Revision of the Binet Tests (starred ones only), and the Memory Span,—audito-vocal, visual and reverse,—and the Memory Span for syllables, were also used.

TABLE 2. HEIGHT AND WEIGHT

Decile	Height	Weight
1	65.4–63	178.5 –131.75
2	62.9–62.4	131.25–121.5
3	62.4–61.6	120.25–113.25
4	61.6–61.0	112.75–109.75
5	61.0–60.6	109.75–106.76
6	60.6–60.0	106.75–102.5
7	60.0–59.6	102.0 – 98.0
8	59.6–59.0	97.5 – 94.0
9	59.0–57.9	94.0 – 87.75
10	57.9–55.4	87.25– 73.25

In addition some group tests were given for immediate grouping, because in no large high school can "grouping by ability" wait upon individual testing. These were the Morgan Group Test of Mental Ability, and the Monroe Silent Reading Test for the ninth grade. The Downey Will Temperament Group Test was also given, as an experimental measure. The Woodworth & Wells Hard Directions Test and the tests of school proficiency were omitted, but records were kept of the actual school progress of each child, in terms of final marks and number of credits. A chart of height, weight and physical characteristics, was made by the teachers in the Physical Education Department.

PHYSICAL CHARACTERISTICS

The distribution of height and weight by deciles is found in Table No. 2. Except in two individuals, cases No. 10 and 17, there were no physical defects of any significance. These are discussed later.

DISCUSSION

Performance Tests

The time ratings for the Witmer Cylinders for both the first and second trials are greater for this group than those given as norms for the fifteen year level. This is a very simple test at this age, the problem is solved easily, although twelve individuals failed

TABLE 3. PERFORMANCE TESTS

Decile	Witmer 1st trial	Formboard 2nd trial	Witmer 1st trial	Cylinders 2nd trial	Healy 1st trial	"A" 2nd trial	Dearborn 1st trial	Formboard 2nd trial
1	12–17	9–11	40– 56	34–42	8– 13	6–8	48– 74	20– 45
2	17–18	12–13	56– 64	43–47	13– 19	8–10	76– 97	45– 52
3	18–19	13–13	64– 70	47–50	20– 26	10–11	99–128	52– 57
4	20–20	13–14	70– 76	50–53	26– 34	11–12	130–150	58– 65
5	20–22	14–15	77– 86	53–56	35– 49	12–15	150–180	65– 80
6	22–23	15–15	86– 99	56–60	51– 68	15–16	180–210	81– 91
7	23–25	16–17	100–118	60–64	70– 97	16–20	210–249	92–115
8	25–27	17–18	119–145	64–71	97–167	20–25	250–336	115–147
9	27–30	18–20	149–211	71–86	170–263	26–45	340–530	148–225
10	30–47	20–30	214–F. (12 cases)	86–232	290–F. (19 cases)	50–F. (3 cases)	535–F. (16 cases)	228–F. (2 cases)

Time given in seconds.
F = Failure.

to do so at the first trial. It then becomes a test of motor response and coördination, in which this group is less proficient than any other high school group. The same kind of results is shown in the judgment ratings given by the teachers in the Physical Education Department. The group as a whole is slow at the start and considerable time is consumed in the execution of simple commands.

The Dearborn Formboard represents a more complicated problem to be solved and hence calls for more intelligence informed by knowledge. It also tests discrimination, distribution of attention, and planfulness. Some idea of an individual's trainability can be obtained by noting the difference in time between the first and second trials. In this test, the ratings for the group are better than the norms made by Dr. Leaming, both for the first and second trials.

No standards have been established at this age for the Witmer Formboard, a four-year-old test. It could have been omitted, but was used for a preliminary "warming up" before the Dearborn Formboard. Mrs. Wooley puts the Healy A test at the fourteen year level. Ninteen girls failed to solve the problem at the first trial, and three continued to fail after being taught. The decile distribution showed a marked reduction of time after the first trial.

Practically all the individuals attacked the performance tests with interest and pleasure. They represented something new. Praise and encouragement at the end of the first trial always brought forth a noticeable response.

Binet Tests

The Binet-Simon Scale is too long to be a part of the testing program in a large school, but it was given here as an important item in a battery of tests. It is criticised as being a test of language ability rather than of intelligence. If that is true, one might expect this group to present rather poor results. Moreover, one must remember that it is more difficult to obtain a high I.Q. at this age level, than at the nine and ten year level.

The Intelligence Quotients range from 131.76 to 68.30. Fifteen per cent of the group have I.Q.'s below 80, which Termain claims to indicate "borderline deficiency," and 32% are between 80 and 90, indicating "dullness." A little more than 1% are below 70, definite "feeblemindedness," and only 24% have an I.Q. of 100 or more. The Median for the group is 90, the modal 60% ranges

from 81.94 to 100.55. Comparing these results with the norms for high school girls established at the Pennsylvania Laboratory we find this group is inferior. There, the I.Q.'s range from 144 to 69, the median is 104, and the middle 60 per cent ranges from 92 to 116, which is much superior to the group under discussion. This may be due to the fact that in this study all the members

TABLE 4. BINET AND MORGAN GROUP TESTS

Deciles	Binet I. Q.'s	Binet Mental Age[1]	Morgan Mental Age[2]
1	131.36–109.09	18–3 –16–0	19.0–16.8
2	109.09–100.86	16–0 –15–0	16.2–15.1
3	100.55– 97.36	15–0 –14–5	15.1–14.6
4	97.25– 93.71	14–4½–13–11	14.6–14.0
5	93.65– 90.00	13–11–13–6½	14.0–13.5
6	90.00– 87.37	13–6½–13–1½	13.5–12.9
7	87.21– 84.30	13–1½–12–9½	12.9–12.4
8	84.20– 81.94	12–9½–13–3½	12.4–11.8
9	81.94– 78.12	12–3½–11–10	11.8–11.3
10	77.86– 68.30	11–9½–10–5	11.3– 9.8

[1] Age expressed in years and months.
[2] Age expressed in years and tenths of years. (decimals)

in the entering group were included whereas in all other investigations the cases were taken "hit or miss" fashion, and many of those who weight the lower end of the scale had been eliminated. Dr. Leaming expressed surprise at the "very low range of the Binet Intelligence Quotients" and concludes that "the lower limit of mental normality falls far below the I.Q. usually accepted." The tragedy lies in trying to give a uniform program of high school education to the lower limits and the upper limits of such a widely extended scale.

A chart showing the numbers passing the individual tests of the Binet at the different age levels is found in Table No. 13. Twenty girls failed to pass all the tests at the ten year level, nineteen had a basal age above twelve, while one hundred sixty-six showed a basal age of ten and twelve. There are some who consider that the basal age level gives a better indication of the intellectual level of the individual than does the mental age. A distribution of basal ages is given in Table No. 14. The median basal age level is twelve years and the median mental age is thirteen years six months.

The greatest number of failures in any Binet Test above the twelve year level occurred in the vocabulary tests, and the arithmetic test at the fourteen year level. In the latter test there were six more failures than in the vocabulary test. The Monroe Silent Reading Test presents the same results for the group. The median is below the norm established for the ninth grade. If such tests have any diagnostic value, they indicate that these children arrive in high school lacking an adequate vocabulary and ability to comprehend the printed page, but they do not show whether this is due to a real mental defect or merely a lack of opportunity because of their non-English environment. If the latter is true, then the "language tool" can be supplied with proper training. Granted a skillfully planned and executed English course in the first term, achievement tests given at the beginning and end of the term, with results expressed in terms of the efficiency gained, would be of more diagnostic value than the Binet vocabulary test. Unfortunately in this study, the Monroe test was not followed up by another one in six months.

Table 5. Monroe Silent Reading Test

Decile	Rate	Comprehension
1	151–137	57–37
2	137–125	36–31
3	125–109	31–28
4	109– 86	28–25
5	86– 86	25–22
6	86– 86	22–18
7	86– 77	18–17
8	77– 77	17–13
9	77– 68	13– 9
10	68– 27	9– 3

9th grade Norm.
Rate—83
Comprehension—23

Memory Span

What abilities are tested in the memory span test? Many investigators have worked in this field, most of them discussing the audito-vocal and the visual forward memory span, and not the reverse span. Whipple says it primarily tests the capacity for reproduction after a single presentation. Humpstone says it is a test

of associability. Brotemarkle claims that it uses the numerous mental factors of the attentional, imaginal, and associational fields. Starr, in 1923, made a very intensive study of the memory span, and included the reverse span. She concludes that the audito-vocal span, forward and reverse, is an index of proficiency of the co-functioning of all the mental competencies involved in any social adjustment, and is not a measure of a single mental ability. These competencies, she states, as a minimum, include attention, comprehension, imageability, associability and retentivity. Surely, even for the minimum, discrimination or differentiation should be added.

Table 6. Binet Vocabulary Test

	9 year	10 year	12 year	14 year	16 year	18 year
Girls who stayed 4 terms		8	66	54	7	1
Girls who left	3	17	25	23	1	0
Total 205	3	25	92	77	8	1

The reverse span differs from the forward in that it is normally one or two digits shorter, and that it indicates the presence of greater amounts of these competencies, and consequently a more highly evolved organization. Hence it shows a "definite level of mentality quite apart from that indicated by the forward span of the same individual." Concentration of attention, and retentivity are necessary to a greater degree in the reverse than in the forward memory span. The reverse span calls for imagery greater in intensity in order to allow complete discrimination, or differentiation, of each unit in the series, and then a sufficiency of comprehension to permit a reorganization and reassembling of these units in a reversed sequence.

But the memory span performance is too complicated for a detailed study of the competencies concerned. The value of the test lies in the fact that it calls into play all of the individual's congenital equipment, and shows how efficiently all his mental competencies function together. "Since the co-functioning of this particular complexus is most essential to social adequacy, the diag-

nostic value of the audito-vocal digit memory span is thereby augmented." McCaulley, in a recent study, shows that the "reverse span is more highly diagnostic than the forward span," and states that "it is a reliable educability test."

Ability to reverse five digits is claimed by Binet to belong to the twelve year level, and ability to reverse six, to the sixteen year level. A reverse span of seven is included in the test for the superior adult level. In general, the greater the reverse span, the higher the I.Q., but there are individuals with an I.Q. which would indicate adequacy who cannot reverse more than four digits. Can any individual with a reverse memory span of only four digits make the necessary adjustments throughout a four year high school course, and receive the badge of achievement at the end? In this group there are two cases with a reverse span of three and sixty-three with a reverse span of four. We shall study them individually and mark their progress, as compared with the remaining 68½% with reverse spans of 5, 6, 7 and 8.

Table 7. Decile Distribution Memory Span For Digits

Decile	Visual	Audito-Vocal	Reverse	Syllables
1	13–9	10–8	8–6	30–27
2	9–9	8–7	6–6	27–26
3	9–8	7–7	6–5	26–26
4	8–8	7–7	5–5	26–25
5	8–8	7–6	5–5	25–24
6	8–7	6–6	5–4	24–22
7	7–7	6–6	4–4	22–20
8	7–7	6–6	4–4	20–18
9	7–7	6–5	4–4	18–18
10	7–6	5–5	4–3	18–10

School Progress

Final marks are given at the end of each term on a five point scale, represented by E, G, F, P, and D. E is excellent, over 90, and D is deficient, under 60. 70 is a passing grade but numerical marks are not given until the last three terms. For this study, the letters were translated into a numerical equivalent which could only grossly approximate the actual grade, and the average for each term obtained. Such results cannot be very satisfactory as there is too large a range represented by the letters. The number

of credits earned seems to be a more reliable index of progress than the term average. See Table No. 9. One credit is given for each hour per week of prepared work satisfactorily completed, and one-half credit for unprepared work (art, physical training, household arts, chorus and typewriting.) Twenty credits are necessary for promotion to the next grade, 160 for graduation. A child may earn 22½ credits in a term, which, with attendance at summer school, makes it possible for her to graduate in three and one-half years. For the same reasons, a child may graduate having failed twenty hours of work (or even more if she makes them up in summer school) provided these failures are not in subjects required for graduation. Each department reserves the right to refuse to give a child a subject for the third time after she has failed it twice. The school is conducted on the Dalton Plan, modified to suit its particular conditions. This not only offers increased opportunity for individual instruction in a socialized environment, but permits each individual to proceed at a pace which better approximates her optimal rate.

Table 8. Reverse Memory Span

Digits	Girls who stayed 4 terms	Girls who did not stay 4 terms	Total
3	1	1	2
4	31	32	63
5	70	23	93
6	23	10	33
7	8	3	11
8	3	0	3
Total	136	69	205

Sixty-five girls took the academic course, planning to go to normal school or to college, but fifteen dropped out entirely during the first two years, and eighteen more changed their minds, and are now trying a course with less mathematics and language. All the others are taking a commercial course, with the idea of being "secretaries."

At the end of the fourth term, 136 girls, 66 per cent of the original 205, are in regular classes, but only sixty-six of them, 32 per cent, have finished successfully four terms of work. See Table No. 10. Sixty-nine girls have dropped out, twelve of them transferred

to other schools, ten left to go to work, seventeen who became sixteen years of age voluntarily stopped. The remaining twenty-eight were failing miserably, some of them for the second time, and were much discouraged, but because they were not yet sixteen years old were forced to keep on. These were removed from regular classes and given a special course, which represents an attempt on the part of the school to adapt the curriculum to the level of the child. It consists largely of English, personal hygiene, cooking, sewing, very elementary social science, filing and typewriting, and trains these children to be fairly efficient file clerks and routine typists. The course is only for a year, when they must leave, and look for a job. They represent a range of I.Q. from 87 to 68, and 50 per cent have a reverse memory span of four, one has three, all the others have five, except one, who has six. She has an I.Q. of 84,

Table 9. Decile Distribution of Averages and Credits—4 Terms*

Decile	Average	Credits
1	92.25–85.67	102 –90
2	85.60–81.90	90 –90
3	81.76–79.98	90 –89
4	79.48–78.25	88 –82
5	78.19–75.03	82 –79½
6	74.79–73.36	79 –70½
7	73.27–70.98	70 –62
8	70.93–69.38	62 –57
9	69.06–66.94	56½–46
10	66.57–63.70	43 –24

* 20 credits. 9b
40 " 10a
60 " 10b
80 " 11a
100 " 11b
120 credits. 12a
140 " 12b
160 " graduation.

and earned only 2½ credits in one term. Of the ten who left to go to work, five were doing successful high school work and five were doing extremely poor work. Four of these who dropped "over age" were passing in their work, the remaining thirteen had a history of failure before they left. Two girls were dismissed for lack of credits. It is a ruling of the Board of Education that if a girl over sixteen years of age fails to pass 50 per cent of her work in one year she may be dismissed at the discretion of the principal. Both these girls were colored. One had an I.Q. of 88, and a reverse

Table 10. Reverse Memory Span, School Average, and Credits,* of the 136 Who Stayed 4 Terms

	Average for 4 terms	Reverse Memory Span						
		3	4	5	6	7	8	
	60–64		2	2	1			
	65–69	1	10	13	2	1		
	70–74		9	20	5	1		
	75–79		7	16	5	1	2	
	80–84		2	12	6	2		
	85–89		1	6	4	1	1	
	90–95			1		2		
	Credits earned in 4 terms							Total
	20–24		1					
	25–29		1					
9b	20–34		1	1	1			7
	35–39			2				
	40–44	1	2	3				
	45–49			2	1			30
10a	50–54		2	3	1	1		
	55–59		6	6	1	1		
	60–64		2	3	2			
	65–69		2	3	2			
10b	70–74		2	8				
	75–79		3	6				33
	80–84		4	6	5	1	1	
	85–89		3	7	2	1		
11a	90–94		2	19	7	2	2	63
	95–99				1			
11b	100			1		2		3
								136

20–39 = 9b
40–59 = 10a
60–79 = 10b
80–99 = 11a

memory span of six. Her basal age was twelve, and she passed no tests above this level except memory span tests. She failed the Dearborn Formboard, and showed very little planfulness, or discrimination in any of the tests. She was imitative and trainable. However, she failed twice in History, Mathematics, English and Science, so there seemed no reason for not enforcing the rule. The other had an I.Q. of 73, an audito-vocal memory span of 5, reverse 4, and a basal age of ten years. The results of the performance tests were consistently poor, in the lowest decile of the group.

One hundred and thirty-six girls are in regular classes at the end of the fourth term. Sixty-three have earned at least 80 credits so are entitled to be put in Grade 11 A, while three, having gone to summer school and earned extra credits, have "skipped" to 11 B. Nine of these sixty-three have a reverse memory span of 4, but only three of them have a record of no failure in any subject. See Tables No. 10 and 11.

TABLE 11. DISTRIBUTION CHART—I. Q. AND CREDITS EARNED IN 4 TERMS

I. Q. Deciles	Credits								
	20–29	30–39	40–49	50–59	60–69	70–79	80–89	90–99	100
1		1	1	1	1	1		11	2
2				2	1		7	4	
3				3	1	3	3	4	1
4		1	2	1	2	1	3	5	
5				3	1	2	7	4	
6		1	1	3	2	4	4	1	
7		1	2	4	1	5	2		
8		1			2	1	2	3	
9	1		1	1	1	2	3	1	
10	1		3	1		1			

All the members of this group display strong motivation in the direction of their greatest ambition. All but one come from very poor homes and the whole family has a great struggle to get along. They are determined to graduate. They dig in their toes and stick grimly. The last girl, No. 10, who lacks only half a credit of being in 11 A, has a history of paralysis, her speech is thick and she drags one foot. Her body is small and under nour-

TABLE 12. 9 GIRLS WITH REVERSE MEMORY SPAN OF 4 PROMOTED TO 11A (80 CREDITS)

Case No.	Age at entering	I. Q.	Binet vocabulary level	Subjects failed	General average for 4 terms	Average for the 4th term
1	13–7	100	12	2	78	71
2	13–4	81	16	0	87	77
3	14–9	78	12	2	78	82
4	14–0	76	12	2	76	73
5	14–0	75	12	2	75	70
6	14–0	78	12	0	78	75
7	14–4	78	12	1	78	73
8	14–4	86	14	0	86	89
9	13–7	81	14	2	81	72
10	15–5	70	12	3	73	75
One girl who lacks ½ credit						

ished. In spite of all handicaps she has persevered, going to summer school both years, making up science conditions in club periods, and attending "restoration classes" in English.

It must be remembered that in the High School every effort is made to classify students on the basis of ability. After the first term this is possible only in those subjects where there are parallel classes. However, in every class the larger group splits up into smaller ones who work as units at their own rate of speed. Each child is led to discover her optimal learning rate and budgets her work and time accordingly. The extremely ambitious ones soon learn the value of such self knowledge, and are quick to take advantage of every opportunity offered to compensate for their defects, and to make good use of their abilities. Consequently many succeed in such an environment who would fail if forced to compete with more able students. On the other hand, the ones more richly endowed are free to progress more rapidly, with time to enter into interesting byways. There is a better chance for stimulation of motivation and for the formation of good intellectual habits.

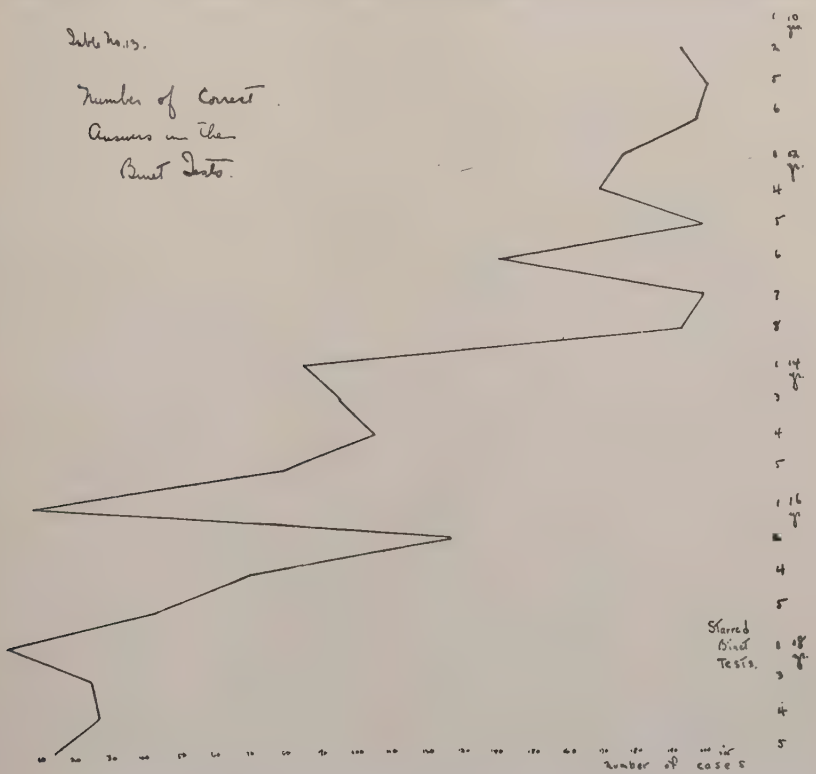
Six girls with a reverse memory span of six and seven failed of being promoted even to 10b in four terms. They are interesting cases and may be analyzed further:

Cases Nos. 11 and 12. They became friendly the latter part of the third term. The former is very evidently the leader. She is of Italian parentage, extremely good-looking, with charming manners, and very popular with the boys. So far as I.Q. is concerned she ranks in the highest decile, and her performance in all tests is equally creditable. She failed two subjects the first term, and the counselor discovered she had been attending a nearby evening school four nights a week, ostensibly for dressmaking, but really to "have some fun." She was the oldest of six, the whole family went to bed early, and "company" was taboo. The night school attendance was stopped but the failures continued, in spite of the interest of the counselor. No. 12 is a pretty Scotch-English child, belonging in the next to the highest decile of the group in the I.Q. distribution, slightly younger than No. 11. Her achievement for the first three terms was fair, but the fourth term was a complete failure. The two girls cut school and classes, and were intelligent enough to "get away with it," or took their punishment submissively, even charmingly, when caught. Being reported to their parents had no lasting effect, and poor marks alarmed them

not at all. They were required to present their final reports for the fourth term to the counselor on the last day, and she made one final effort to secure a change in motivation for the coming year.

No. 13. Her parents were born in Russia, and since coming here have established themselves in a good business and prospered. They have allowed their only child to do as she pleases, and so far she pleases not to study. Her I.Q. places her in the first decile

Table 13. Number of Correct Answers in the Binet Tests



of the group, and her basal age is fourteen. She had an audito-vocal memory span of nine and reverse of six. She passed the eighth grade at thirteen and one half years of age. In four terms she has failed almost half her work,—her teachers say she is "lazy."

No. 14 is the second child in an extremely poor Russian Jewish family. She entered at exactly thirteen years of age, with the

strong determination to graduate and work in an office. Her I.Q. is 109, due largely to the points earned by a high auditory-vocal and reverse memory span. Her basal age is twelve, and her vocabulary is just barely at the twelve year level. Her definitions were given slowly and painfully, as were all her responses. The Dearborn Formboard was solved in a slow trial and error fashion, with great deliberation, and no effort to hurry, in eight minutes four seconds, and on the second trial in just half the time. The attack was just the same, as the first trial, but a large number of the errors were omitted. Her conspicuous failures are in English and mathematics. So far, she has passed them on the second trial. In the fourth term, however, she failed history, and science also. She is attempting only minimum requirements, and failing, in the same time limits in which other girls of apparently no better ability are succeeding in doing maximum work.

No. 15 is also a Russian Jewess. She entered at fifteen and one half years of age, planning to stay and graduate. Her I.Q. is 85, and reverse memory span six, the only test she passed above the fourteen year level. Her performance tests showed good planfulness and discrimination. She failed history and science the first term, passed them on the second trial, but failed the 9b work twice. She may try them for the third time when she presents a report with no failures in any subject.

No. 16 is a Russian Jewess, entering at fourteen years of age, planning to become a teacher. Her I.Q. is 97, with auditory vocal and reverse span of seven, which were the only tests she passed above the twelve year level, except the "president and king" at the fourteen year level. She failed the first series of seven digits forward, and repeated the second series given, but with an apparent lack of sureness, haltingly. The reverse of seven, however, was given quickly and casually at the first attempt. One wonders if the true span was ascertained. Her first term in the academic course was almost a complete failure; so she gave up the idea of going to Normal School and tried the Commercial Course. The next two terms were successful, but in the fourth term she earned only 10½ credits.

Very evidently a good reverse span alone is not sufficient for predicting academic success, many other factors must be considered.

There were two girls with a reverse span of three. One was put in the Special Course after the first term, but she did not finish even that work. The other is described as follows:

Table 14. Number of Cases in Each Basal Age. Binet Test

No. 17 is a girl with reverse memory span of three, who earned forty-three credits in four terms, a trifle more than 50 per cent of the number required. She is of Italian parentage, very unattractive in appearance, so short and stout that she approaches deformity. She did not walk until almost eight years of age due to braces on both legs, put there because of "nervous weakness." This is the only information the examiner could gather, all questions

brought forth only vague, indefinite and often contradictory answers. She was then almost eighteen years old, and outwardly showed no effects of this earlier affliction, whatever it may have been. She stated her ambition to be a teacher in an habitually placid, self-confident manner. Her I.Q. is 69, she failed two tests at the twelve year level (sentences, and reverse span) and one at the ten year level Her performance tests were all trial and error, but her movements were extremely quick, so that the problems were solved in fair time. The second trials were little better than the first. The first term, she failed everything but English, and was told very frankly that such performance would never permit entrance to Normal School, but she insisted doggedly upon another trial. At the end of the second term she had twenty-one credits, so could not be dismissed. Her self confidence re-asserted itself and she continued to plug along. By the end of the fourth term she had failed three subjects for the second time and became convinced herself that she could not succeed, and told the counselor she would not return. On that occasion, with all confidence gone, she was rather a pathetic object. Fortunately the counselor could point to the good marks she had consistently gained in art, sewing, and gym, and give a gentle push in the direction she should have been guided years before.

At the end of the fourth term, another girl dropped out also. She was failing and saw very little prospects of success. Because of failure in English she could not begin Stenography with the other girls so decided to try Business College. Her I.Q. was 81, reverse memory span 4. Two other girls were dismissed for lack of credits. Their I.Q's. were 85 and 89 respectively and both had a reverse memory span of five. Two others with insufficient credits but who were not yet fifteen years of age, were placed in the Special Course. One had an I.Q. of 89 and reverse span of four, and the other had an I. Q. of 85 and reverse span of five.

Girls who voluntarily drop out because of failure or who are forced to drop, represent failure on the part of the School system, somewhere. As Inglis, in his Principles of Secondary Education, has said, "we have failed to adapt instruction to the varying capacities of those whom we have encouraged to attend the high school." The high school's obligation lies in excluding those of lower intellectual ability, or, in affording them the sort of education suited to their capacities and their needs.

One hundred and thirty girls, then, are ready for the fifth term, representing 63 per cent of the number[1] who started two years before. Twenty-nine of them have a reverse memory span of four, 46 per cent of the number with that span who entered, though only nine of them can be called successful.

Conclusions

Conclusions made at the end of two years' progress can be only partial ones, and may be changed at the end of the next two years.

1. The Fifteen-year-Level represents a wide range of variability.

2. The chances for High School success are very poor for students with a reverse memory span of only four digits.

3. Strong motivation for success can bring achievement in the face of great odds, given an optimal environment and skillful teaching.

4. A high reverse memory span does not necessarily supply a diagnosis for predicting success.

Bibliography

Brotemarkle, R. A. *Some Memory Span Problems. An Analytic Study of the College Adult Level.* Psych. Clinic, 1924.

Dearborn, W. I. (with J. E. Anderson, A. O. Christiansen) *Formboard and Construction Tests of Mental Ability* Jour. of Educ. Psych., 1916, 7, 448.

Healy, Wm., and others. *Manual of Individual Mental Tests and Testing.* Little, Brown and Company, Boston, 1927.

Humpstone, H. J. *Some Aspects of the Memory Span Test. A study in Associability.* The Psychological Clinic Press, Philadelphia, Pa., 1917.

Humpstone, H. J. *Memory Span Tests.* The Psych. Clinic, 1919, Nos. 5-9.

Leaming, R. E. *Tests and Norms for Vocational Guidance at the Fifteen-Year-Old Level.* Psychological Clinic, 1922, 14, 193.220.

Mudge, E. L. *The Superior Girl in Early Adolescence.* Ped. Sem. 1923, 30, pp. 45-47.

Paschal, F. C. *The Witmer Cylinders.* Hershey Press Co., Hershey, Pa., 1918.

Proctor, W. M. *Psych. Tests as a Means of Measuring the Probable Success of High School Pupils,* Journal of Ed. Res. Vol. 1, April 1920.

Rubinow, I. M. M. D. *Medical Factors in Family Case Work,* Survey, March 15, 1924.

[1] The number (205) which is included in this study, 30½% of the total number who started (428).

SHERMAN, W. D. *A Study of the Achievement of the Grad. Class of the Grover Cleveland High School, St. Louis.* SCHOOL REVIEW Vol. 34.

SKAGGS, E. B. *The Correlation of General Intelligence Tests and School Standing.* JOURNAL OF EDUC. PSYCH., 1920, 11, 169-171.

STARR, ANNA SPIESMAN *The Diagnostic Value of the Audito-Vocal Digit Memory Span.* THE PSYCHOLOGICAL CLINIC, 1923, Nos. 3-4, pp. 61-84.

TERMAN, L. M. *The Measurement of Intelligence. The Stanford Revision and Extension of the Binet-Simon Intelligence Scale.* HOUGHTON MIFFLIN CO., 1916.

The Intelligence of School Children. HOUGHTON MIFFLIN CO., 1919.

THURSTONE, L. L. *The Mental Age Concept.* PSYCH. REVIEW, 1926, 33, 268-278.

VITELES, MORRIS. *Psych. Tests in Guidance. Their Use and Abuse.* SCHOOL AND SOCIETY, Vol. 22, Sept. 19, 1925.

WITMER, L. *Reference Book in Clinical Psychology and for Diagnositc Teaching.* PSYCHOLOGICAL CLINIC, Vol. XII, Nos. 5-9, pp. 145-170.

Psychological Diagnosis and the Psychonomic Orientation of Analytic Science. PSYCHOLOGICAL CLINIC, 1925, Nos. 1-2, pp. 1-18.

YATES, D. H. *A Study of Some High School Seniors of Superior Intelligence.* BLOOMINGTON PUB. SCHOOL PUB. CO., 1922.